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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Leonard A. Pomeranz

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EXAMINER

CARTER, MICHAEL W

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,321	Applicant(s) POMERANZ, LEONARD A.	
	Examiner MICHAEL CARTER	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 13 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 3,6-8 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,9-11 and 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/08/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. **Claims 3, 6-8, and 12** have been canceled.

Response to Arguments

2. Applicant's arguments, filed 12/13/2007, have been considered but are moot in view of newly found prior art and the new grounds of rejection below.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claim 14** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 14 includes the limitation "said optical parametric oscillator is in the form of a linear resonator." Claim 14 depends from claim 9 which includes the limitation "said optical parametric oscillator is in the form of a ring." These are conflicting limitations and therefore make the claim indefinite. For purposes of the art rejection of claim 14 below, it is assumed that claim 14 depends from claim 19.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
7. **Claims 1, 2, and 4-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Esterowitz et al. US Patent 6,358,243 (hereinafter referred to as '243) in view of Esterwitz et al. US Patent 4,965,803 (hereinafter referred to as '803).

8. **For claims 1 and 5**, '243 teaches a method of pumping a wide bandwidth optical parametric oscillator to provide mid-IR radiation (figure 1), comprising the step of pumping the optical parametric oscillator with a laser using a wavelength of about 2 microns operating by itself as a pump source (figure 1, label 11) for the optical parametric oscillator, wherein the optical parametric oscillator includes a zinc germanium phosphide non-linear crystal (figure 1, label 13 and column 4, lines 1-8).

Reference '243 does not the laser is a Thulium laser.

However, these lasers are well known in the art as shown by reference '803, which shows a Thulium laser which operates at 2 microns (figure 1 and abstract). The particular laser used in '243 does not appear critical to the operation of the device, therefore it would have been obvious to one skilled in the art to substitute the known laser of '803 into the system of '243 by an obvious engineering design choice.

9. **For claim 2**, '803 teaches the Thulium laser utilizes a YAlO_3 host (column 4, lines 1-11). While '803 discloses YAlO instead of YAlO_3 , YAlO is an acronym for YAlO_3 (see teaching reference Sheps US Patent 6,404,7085, column 1, lines 50-51). This interpretation is further supported by the specification of the instant application (page 6, lines 10-11).

10. **For claim 4**, '803 further teaches the Thulium laser is Q-switched (figure 1, label 29 and column 1, line 54).

11. **Claims 9-11, 14-22, and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over '243 in view of '803, and further in view of Smith et al. US Patent 6,647,033 (hereinafter referred to as Smith).

12. **For claim 9**, the prior combination is applied as to claim 1.

The prior combination does not teach the optical parametric oscillator is in the form of a ring.

However, Smith does teach a ring laser forms a suitable cavity to permit oscillation in an OPO (figure 1, labels 24, 38, and 31 and column 1, lines 29-31).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Smith's ring cavity with the prior combination in order to permit oscillation in the cavity.

13. **For claims 10 and 17**, '803 is applied as to claim 2 above.

14. **For claims 11, 16, and 18** '243 teaches the optical parametric oscillator includes a zinc germanium phosphide non-linear crystal (figure 1, label 13 and column 4, lines 1-8).

15. **For claim 15**, the combination is applied as to claim 9. Smith further teaches the oscillator is doubly resonant in order to permit oscillation at both the signal and idler frequencies (column 1, lines 27-34).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the OPO of the previous combination with Smith's doubly resonant cavity in order to permit oscillation at both the signal and idler frequency.

16. **For claim 19**, '243 and '803 is applied according to claim 1.

'243 and '803 do not teach the optical parametric oscillator is doubly resonant. However, Smith teaches the oscillator is doubly resonant in order to permit oscillation at both the signal and idler frequencies (column 1, lines 27-34).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the OPO of the previous combination with Smith's doubly resonant cavity in order to permit oscillation at both the signal and idler frequency.

17. **For claim 20** '803 is applied as to claim 2 above.

18. **For claim 21**, '243 teaches the optical parametric oscillator includes a zinc germanium phosphide non-linear crystal (figure 1, label 13 and column 4, lines 1-8).

For claim 22, Smith teaches a ring laser forms a suitable cavity to permit oscillation in an OPO (figure 1, labels 24, 38, and 31 and column 1, lines 29-31).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine Smith's ring cavity with the prior combination in order to permit oscillation in the cavity.

19. **For claim 24 and 14**, '243 teaches the optical parametric oscillator is in the form of a linear resonator (figure 1, labels 17 and 19).

20. **Claim 13 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over '243 in view of '803, and Smith, and further in view of Komine, US patent 6,215,800 (hereinafter referred to as Komine).

21. **For claims 13 and 23**, the previous combination remains applied as to claims 9 and 22 respectively.

The previous combination does not teach including two ZnGeP_2 non-linear crystals.

However, Komine does teach including two non-linear crystals in an OPO in order to increase interaction length (column 2, line 39-41).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to combine two crystals, as taught by Komine, with the OPO of the previous combination in order to increase interaction length.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL CARTER whose telephone number is (571)270-1872. The examiner can normally be reached on Monday-Friday, 7:00 a.m.-4:30 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MC/

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828